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For: INK SET, METHOD OF RECORDING WITH THE SAME, AND PRINT

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[Title of the Invention] INK SET, RECORDING METHOD USING SAME, AND RECORDING

[Claims]

[Claim 1]

An ink set comprising a dark ink composition and a light ink composition that, while being mutually of same color, are of different color density; characterized in that:

said dark ink composition and said light ink composition each at least contains a pigment as a colorant and a resin as a dispersant;

weight ratio between said resin and said pigment (former/latter) in said dark ink composition is lower than weight ratio between said resin and said pigment (former/latter) in said light ink composition.

[Claim 2]

The ink set according to claim 1, characterized in that difference between weight ratio between resin and pigment (former/latter) in said light ink composition, on one hand, and weight ratio between resin and pigment (former/latter) in said dark ink composition, on other hand, is from 0.01 to 0.5.

[Claim 3]

The ink set according to claim 1 or 2, characterized in that said dark ink composition is a cyan ink composition and/or a magenta ink composition, and said light ink composition is a light cyan ink composition and/or a light magenta ink composition.

[Claim 4]

The ink set according to claim 3, characterized in that colorant in both said cyan ink composition and said light cyan ink composition is a cyan pigment, and colorant in both said magenta ink composition and said light magenta ink composition is a magenta pigment.

[Claim 5]

The ink set according to claim 4, characterized in that said cyan pigment is one or more types selected from a group consisting of C.I. pigment blue 15:3, 15:4, and 60, and said magenta pigment is one or more types selected from a group consisting of C.I. pigment red 122, 202, and 209, and C. I. pigment violet 19.

[Claim 6]

The ink set according to any of claims 1 to 5, further comprising a yellow ink composition and/or a black ink composition.

[Claim 7]

The ink set according to claim 6 characterized in that colorant in said yellow ink composition is one or more types of yellow pigment selected from a group consisting of C.I. pigment yellow 74, 93, 109, 110, 128, 138, 150, 151, 154, 155, 180, and 185, and colorant in said black ink composition is carbon black.

[Claim 8]

An ink jet recording method for performing printing by discharging liquid drops of an ink composition and causing said ink drops to adhere to a recording medium, characterized in that:

the ink composition of the ink set cited in any of claims 1 to 7 is used as said ink composition.

[Claim 9]

A recording characterized in that said recording is recorded using the ink set cited in any of claims 1 to 7, or by the ink jet recording method of claim 8.

[Detailed Description of the Invention]

[0001]

[Field of the Invention]

This invention relates to an ink set, and to an ink jet recording method and recording using the same, and more particularly relates to an ink set that exhibits good ink permeability and fixation and is capable of producing high quality images with no roughness, and to an ink jet recording method and recording wherein that ink set is used.

[0002]

[Related Art and Problems Which the Invention Intends to Solve]

An ink jet recording method is a printing method wherewith droplets of an ink composition are sent into flight and made to adhere to a recording medium such as paper. This method is characterized in that therewith it is possible to print images of high resolution and high quality at high speed with a comparatively inexpensive apparatus.

[0003]

In recent years, based on such an ink jet recording method as this, color images are being formed using a plurality of color ink compositions. Generally, color image formation is being performed with an ink set comprising three color compositions, i.e., a yellow ink composition, a magenta ink composition and a cyan ink composition, four color compositions wherein

a black ink composition is added to those noted above, or dark and light ink compositions that, while being the same in color, are classified into various kinds of colors based on their lightness and darkness (density of colorant).

[0004]

However, such a conventional ink set, which has been used for forming a color image, has difficulty in causing ink to permeate a recording medium and therefore, exhibits bad ink fixation. As a result, ink builds up on the surface of the recording medium, is scattered, and dries, so that a condition of "roughness" readily develops. Therefore, the fact is that sufficiently high quality images have not yet been obtained

[0005]

Accordingly, an object of the present invention is to provide an ink set that exhibits good ink permeability and fixation and is capable of obtaining high quality images with no roughness, an ink jet recording method and recording wherein the same is used.

[0006]

[Means for Solving the Problems]

Firstly, the inventors found, as a result of assiduous investigation, that an ink set comprising dark and light compositions wherein weight ratio between a resin as an dispersant and a pigment as a colorant (former/latter) in the dark ink composition is lower than weight ratio between resin and pigment (former/latter) in the light ink composition, would achieve the above object.

[0007]

This invention, which has as its foundation the finding noted above, is an ink set comprising a dark ink composition and a light ink composition that, while being mutually the same color, are of different color density, characterized in that the dark ink composition and the light ink composition each comprise a pigment as a colorant and a resin as a dispersant, and in that wherein weight ratio between the resin and the pigment (former/latter) in the dark ink composition is lower than weight ratio between the resin and the pigment (former/latter) in the light ink composition.

[0008]

[Mode for Carrying Out the Invention]

Detailed descriptions are given below of the ink set of the present invention.

[0009]

The ink set of the present invention is an ink set comprising a dark ink composition and a light ink composition that are mutually the same color but have different color densities. What is meant here by saying "mutually the same color" is that ink compositions wherein the same colorant is mutually used but the concentration of the colorant in the ink compositions is different because of the difference in weight ratio between the colorant and a dispersant for dispersing the colorant are included in the same color.

[0010]

Both the dark ink composition and the light ink composition, respectively, at least comprise a pigment as a colorant and a resin as a dispersant.

[0011]

Also, weight ratio A between resin and pigment in the dark ink composition (former/latter) is lower than weight ratio B between resin and pigment in the light ink composition (former/latter). The resin weight proportion as used here is the solid portion equivalent quantity. Thus, when the ink set of the present invention comprising such dark and light ink compositions wherein weight ratio A is lower than weight ratio B is used, ink easily permeate a recording medium and ink fixation is good. Therefore, high quality images are obtained which exhibit no roughness. The reason therefor is not known for certain, but it is conjectured that ink dispersion characteristics and dispersion stability differ depending on the weight ratio between the pigment and the resin in the ink compositions, and that this phenomenon is caused by differences in dispersion characteristics between the dark and light ink compositions themselves. More specifically, in an ink composition, as diagrammed in Fig. 1, the resin is adsorbed to the pigment, a "resin layer" is formed, and, thereby, a stable dispersion can be obtained. It is conjectured that this interaction between the pigment and the resin influences pigment dispersion characteristics and dispersion stability, so that, in the ink set of the present invention, the outstanding benefits described earlier are realized. When the ink set of the present invention is used, as diagrammed in Fig. 2, after the ink set strikes the recording medium, the ink set progressively becomes fixed while permeating into the recording medium. In contrast therewith, when a conventional ink is used, as diagrammed in Fig. 3, after the ink strikes the recording medium, the ink does not penetrate very far into the recording medium, the ink gets built up on the surface of the recording medium, and it also scatters.

[0012]

The difference between the weight ratio A and the weight ratio B (weight ratio B minus weight ratio A) relating to dark and light ink compositions included in the ink set of the present invention should be 0.01 to 0.5, and preferably 0.1 to 0.4.

[0013]

There is no particular limitation on the pigments contained in the dark and light ink compositions noted above, and either inorganic pigments or organic pigments that produce the desired color can be used.

In the ink set of the present invention, the dark ink composition should be a cyan ink composition and/or a magenta ink composition, while the light ink composition should be a light cyan ink composition and/or a light magenta ink composition. That is, for the dark and light ink compositions, either a combination of a cyan ink composition and a light cyan ink composition should be used, or a combination of a magenta ink composition and a light magenta ink composition should be used, or both of these combinations should be used.

Also, the pigments for the cyan ink composition and the light cyan ink composition should both be cyan pigments, and the pigments for the magenta ink composition and the light magenta ink composition should both be magenta pigments.

[0014]

For the cyan pigment noted above, use should be made of C. I. pigment blue 15:3, 15:4, and 60 or the like, with C. I. pigment blue 15:3 being particularly preferable. For the magenta pigment noted above, use should be

made of C. I. pigment red 122, 202, or 209, or C. I. pigment violet 19, or the like, with C. I. pigment red 122 being particularly preferable. These cyan pigments and magenta pigments may be used singly by type or in mixtures of two or more types.

[0015]

The amount of pigment added should be, in the dark ink composition, 1.0 to 5.0 wt.%, but preferably 1.5 to 4.5 wt.%, and in the light ink composition, 0.1 to 1.5 wt.%, but preferably 0.2 to 1.2 wt.%.

[0016]

In the present invention, these pigments can be added to the ink as a pigment dispersion obtained by dispersing these pigments in an aqueous medium using a resin as the aforementioned dispersant, or surfactant. For the resin as the dispersant, a resin commonly used in preparing a pigment dispersion, such as a polymer resin, for example, can be used.

[0017]

Examples of such a polymer resin that might be sited include (meth)acrylic resins, vinyl acetate resins, styrene-butadiene resins, vinyl chloride resins, (meth)acrylic-styrene resins, butadiene resins, styrene resins, cross-linked (meth)acrylic resins, cross-linked styrene resins, benzoguanamine resins, phenol resins, silicone resins, and epoxy resins, etc., among which the (meth)acrylic-styrene resins are particularly to be preferred.

[0018]

It is further preferable that the (meth)acrylic-styrene resins noted above be water soluble, with molecular weights of from 1,000 to 15,000, but more

preferably from 3,000 to 10,000, and with an acid value of from 50 to 200 but more preferably from 70 to 150.

[0019]

As to the amount of resin added (solid portion equivalent), that is to be an amount that is within such range that, in terms of weight ratios relative to the pigment, the weight ratio in the dark ink composition is lower than the weight ratio in the light ink composition, and is not particularly limited so long as it is within that ratio. The resin, moreover, ordinarily, in the case of the dark ink composition, should be added in amounts of 10 to 100 parts by weight, but preferably 20 to 80 parts by weight, to 100 parts by weight of pigment, and in the case of the light ink composition, in amounts of 10 to 100 parts by weight, but preferably 20 to 100 parts by weight, to 100 parts by weight of pigment.

[0020]

Citable examples of the surfactant noted earlier include anionic surfactants (such as sodium dodecyl benzene sulfonate, sodium laurylate, and ammonium salts of polyoxyethylene alkyl ether sulfates, for example), and non-ionic surfactants (such as polyoxyethylene alkyl ethers, polyoxyethylene alkyl esters, polyoxyethylene sorbitan fatty acid esters, polyoxyethylene alkyl phenyl ethers, polyoxyethylene alkyl amines, and polyoxyethylene alkyl amides, for example). It is also possible to use acetylene glycols (such as Olfin Y, surfynol TG, and surfynol 82, 104, 440, 465, and 485 (all made by Air Products and Chemicals, Inc.). These can be used singly or in mixtures of two or more types.

[0021]

The amount of surfactant added should be, in the dark and the light ink compositions, 0.05 to 5 wt.%, but preferably 0.1 to 1.5 wt.%.

[0022]

For the aqueous medium noted earlier, water or an organic solvent is used.

[0023]

When water is used as the aqueous medium, the water is added as the remaining amount for each component in the dark and light ink compositions.

[0024]

When an organic solvent is used as the aqueous medium, that organic solvent may be either an organic solvent with a low boiling point or an organic solvent with a high boiling point. Preferred examples of such low-boiling-point organic solvents that may be cited include methanol, ethanol, n-propyl alcohol, isopropyl alcohol, n-butanol, sec-butanol, tert-butanol, isobutanol, and n-pentanol. Monovalent alcohols are particularly preferable. These low-boiling-point organic solvents are effective in shortening the drying time of the ink composition and hence are preferred. Also, however, preferred examples of the high-boiling-point organic solvents include polyvalent alcohols such as ethylene glycol, diethylene glycol, triethylene glycol, polyethylene glycols, polypropylene glycols, propylene glycol, butylene glycol, 1,2,6-hexane triol, thioglycol, hexylene glycol, glycerin, trimethylol ethane, and trimethylol propane, etc., such alkyl ethers of polyvalent alcohols as ethylene glycol monoethyl ether, ethylene glycol monobutyl ether, diethylene glycol monomethyl ether, diethylene glycol monoethyl ether, triethylene glycol monomethyl ether, triethylene glycol monoethyl ether, and triethylene glycol

monobutyl ether, etc., urea, 2-pyrrolidone, N-methyl-2-pyrrolidone, 1,3-dimethyl-2-imidazolidinone, and triethanol amine, etc.

[0025]

The amount of low-boiling-point organic solvent added, in the dark and light ink compositions, should be 0.5 to 10 wt.%, and preferably 1.5 to 6 wt.%. The amount of high-boiling-point organic solvent added, in the dark and light ink compositions, should be 0.5 to 40 wt.%, and preferably 2 to 20 wt.%.

[0026]

In the present invention, it is preferable that the dark and light ink compositions each comprise a resin emulsion wherein resins are used as the dispersant and water is used as the continuous phase. The resins are preferably polymers that have a hydrophilic portion and a hydrophobic portion together. There is no particular limitation on the size of the particles in these resins so long as they form emulsions, but they should nevertheless be 150 nm or less in diameter, and preferably from 5 to 100 nm in diameter.

[0027]

These resin emulsions can, depending on the case, be obtained by dispersion-polymerizing resin monomers in water together with a surfactant. For example, (meth)acrylic resin or styrene-(meth)acrylic resin emulsions can be obtained by dispersion-polymerizing a (meth)acrylic acid ester, or a (meth)acrylic acid ester and styrene, in water together with a surfactant. The mixing proportion (weight ratio) between the resin component and the surfactant should be from 10:1 to 5:1. By the amount of surfactant used being within the ranges noted, good ink composition water resistance and

permeability are obtained. There is no particular limitation on the surfactant, but the surfactants noted earlier may be cited as preferred examples.

[0028]

The proportion of the resin as the dispersion phase component and the water as the continuous phase component should be such that there are 60 to 400 parts by weight of water, but preferably 100 to 200 parts by weight thereof, to 100 parts by weight of resin.

[0029]

For such resin emulsions as above, publicly known resin emulsions can be used. The resin emulsions described in Japanese Patent Publication No. S62-1426/1987 (published), Japanese Patent Application Laid-Open No. H3-56573/1991 (published), Japanese Patent Application Laid-Open No. H3-79678/1991 (published), Japanese Patent Application Laid-Open No. H3-160068/1991 (published), and Japanese Patent Application Laid-Open No. H4-18462/1992 (published), for example, can be used without modification.

[0030]

Commercially available resin emulsions can also be used. Examples that may be cited include Microgel E-1002, E-5002 (styrene-acrylic resin emulsions, made by Nippon Paint Co., Ltd.), Boncoat 4001 (acrylic resin emulsion, made by Dainippon Ink and Chemicals, Inc.), Boncoat 5454 (styrene-acrylic resin emulsion, made by Dainippon Ink and Chemicals, Inc.), SAE-1014 (styrene-acrylic resin emulsion, made by Nippon Zeon Co., Ltd.), and Zybinol SK-200 (acrylic resin emulsion, made by Saiden Kagaku K.K.).

[0031]

In the dark and light ink compositions, the resin emulsion should be contained such that the resin component thereof is 0.1 to 40 wt.%, and preferably 1 to 25 wt.%, of the ink composition. The resin emulsion is effective in suppressing the permeation of the pigment that is the colorant, and promoting fixation to the recording medium. Depending on the type of the resin emulsion, moreover, a coating can be formed on the surface of the ink image on the recording medium and the wear resistance of the printed matter thereby improved.

[0032]

It is preferable that the resin used for dispersion phase of the resin emulsion noted above be a thermoplastic resin. Here, by thermoplastic resin, is meant one having a normal softening temperature of from 50 to 250°C but preferably from 60 to 200°C. Here, the term softening temperature means the lower of the thermoplastic resin glass transition point, melting point, temperature at which the viscosity becomes 1011 to 1012 poise, flow point, and minimum film formation temperature (MFT) when in the form of a resin emulsion. In the heating process of the method for recording printed images using the ink set of the present invention, the recording medium is heated to a temperature that is equal to or higher than the softening temperature of the thermoplastic resin. It is preferable that these resins be such that, when they are heated to or higher than the softening or fusion temperature, and then cooled, they form a strong film that is water resistant and wear resistant.

[0033]

The dark and light ink compositions can contain an inorganic oxide colloid (also called an inorganic oxide sol). It is possible to use commercially available colloids for such an inorganic oxide colloid.

[0034]

The dark and light ink compositions, furthermore, can also contain an alkyl ether derivative of a polyvalent alcohol, having 3 or more carbons.

[0035]

The dark and light ink compositions, furthermore, may contain a saccharide.

[0036]

It is also possible to add other additives to the dark and light ink compositions, as necessary, such as pH adjusters, preservatives, and mildew-proofing agents.

[0037]

The ink set of the present invention can also comprise an ordinary ink composition, other than the dark and light ink compositions noted above. It is preferable that such an ink composition be a yellow ink composition or a black ink composition. For the components used in these ink compositions, the colorants, dispersants, and the like used in ordinary ink compositions can be used without any particular limitation.

[0038]

For the colorants in the yellow ink composition and black ink composition noted above, a yellow pigment and a black pigment are used, respectively, to good effect. Citable examples of such a yellow pigment include C. I. pigment yellow 74, 93, 109, 110, 128, 138, 150, 151, 154, 155,

180, and 185, while carbon black or the like may be used for the black ink pigment.

[0039]

Furthermore, the ink set of the present invention can comprise, as necessary, an orange ink composition containing an orange ink pigment such as C. I. pigment orange 36 or 43, or a green ink composition containing a green ink pigment such as C. I. pigment green 7 or 36, or the like.

[0040]

By using the ink set of the present invention, high quality image recordings can be provided that exhibit no roughness.

[0041]

The ink set of the present invention can be employed in various types of printing schemes, but it can be used with particularly good effect in an ink jet recording scheme.

[0042]

Also, based on a method that uses the ink compositions of the ink set of the present invention as described in the foregoing for the ink compositions noted earlier, with an ink jet recording scheme that performs printing by discharging liquid drops of an ink composition and causes those liquid drops to adhere to a recording medium, the ink permeability and fixation into and to the recording medium are good, and high quality images can be obtained that exhibit no roughness.

[0043]

[Embodiments]

Next, the present invention is described more specifically in terms of embodiments, but the present invention is in no way limited by these examples. Unless otherwise noted, moreover "%" is to be understood as "wt.%."

Embodiment 1

Ink Set A

An ink set A consisting of the ink compositions (1) to (6) noted below was prepared. Lm refers to a light magenta light ink and Lc to a light cyan light ink.

((1): Magenta ink composition)

C.I. pigment red 122	3.5%
Dispersant (styrene-acrylic acid copolymer)	1.3% (solid part)

(ratio of resin to pigment (weight ratio) = 0.37)

Glycerin	15%
Triethanolamine	0.5%
Ethylene glycol	4%
Surfynol 465	1%

(Product name; acetylene glycol based surfactant made by Air products and Chemicals Inc., and so hereinafter)

Triethylene glycol monobutyl ether	4%
2-pyrrolidone	4%
Pure water	Remainder

((2): Lm ink composition)

C.I. pigment red 122	0.7%

Dispersant (styrene-acrylic acid copolymer)	0.4% (solid part)
(ratio of resin to pigment (weight ratio) = 0.57)	
Glycerin	18%
Diethylene glycol	5%
Ethylene glycol	5%
Surfynol 465	0.8%
Triethylene glycol monobutyl ether	5%
2-pyrrolidone	4%
Pure water	Remainder
((3): Cyan ink composition)	
C.I. pigment blue 15:3	2.5%
Dispersant (styrene-acrylic acid copolymer)	0.9% (solid part)
(ratio of resin to pigment (weight ratio) = 0.36)	
Glycerin	10%
Ethylene glycol	5%
Triethanolamine	0.8%
Surfynol 465	1%
Triethylene glycol monobutyl ether	5%
2-pyrrolidone	4%
Pure water	Remainder
((4): Lc ink composition)	
C.I. pigment blue 15:3	0.6%
Dispersant (styrene-acrylic acid copolymer)	0.4%

	(solid part)
(ratio of resin to pigment (weight ratio) = 0.67)	
Glycerin	20%
Diethylene glycol	8%
Triethanolamine	0.7%
Surfynol 465	1.2%
Triethylene glycol monobutyl ether	6%
2-pyrrolidone	6%
Pure water	Remainder
((5): Black ink composition)	
Carbon black	3.4%
Dispersant (styrene-acrylic acid copolymer)	1.5%
	(solid part)
Glycerin	15%
Ethylene glycol	3%
Triethanolamine	0.7%
Surfynol 465	1.5%
Triethylene glycol monobutyl ether	7%
2-pyrrolidone	4%
Pure water	Remainder
((6): Yellow ink composition)	
C.I. pigment yellow 128	4.1%
Dispersant (styrene-acrylic acid copolymer)	1.8%
	(solid part)
Glycerin	12%

Ethylene glycol	2%
Triethanolamine	0.7%
Surfynol 465	1%
Triethylene glycol monobutyl ether	8%
2-pyrrolidone	2%
Pure water	Remainder

[0044]

Embodiment 2

Ink Set B

An ink set B consisting of the ink compositions I to VI noted below was prepared.

(I: Magenta ink composition)

C.I. pigment red 122	3.1%
Dispersant (styrene-acrylic acid copolymer)	1.1%
	(solid part)
(ratio of resin to pigment (weight ratio) = 0.35)	
Glycerin	13%
Diethylene glycol	5%
Surfynol 465	1%
Diethylene glycol monobutyl ether	4%
Pure water	Remainder

(II: Lm ink composition)

C.I. pigment red 122	0.9%
Dispersant (styrene-acrylic acid copolymer)	0.5%
	(solid part)

(ratio of resin to pigment (weight ratio) = 0.55)	
Glycerin	20%
Ethylene glycol	5%
Triethanolamine	0.7%
Surfynol 465	1%
Diethylene glycol monobutyl ether	8%
2-pyrrolidone	2%
Pure water	Remainder
(III: Cyan ink composition)	
C.I. pigment blue 15:3	2.4%
Dispersant (styrene-acrylic acid copolymer)	0.6%
	(solid part)
(ratio of resin to pigment (weight ratio) = 0.25)	
Glycerin	13%
Ethylene glycol	5%
Triethanolamine	0.8%
Surfynol 465	1%
Triethylene glycol monobutyl ether	5%
Pure water	Remainder
(IV: Lc ink composition)	
C.I. pigment blue 15:3	0.8%
Dispersant (styrene-acrylic acid copolymer)	0.4%
	(solid part)
(ratio of resin to pigment (weight ratio) = 0.50)	
Glycerin	18%

Ethylene glycol	9%
Triethanolamine	0.7%
Surfynol 465	0.8%
Triethylene glycol monobutyl ether	5%
2-pyrrolidone	3%
Pure water	Remainder
(V: Black ink composition)	
Carbon black	3.4%
Dispersant (styrene-acrylic acid copolymer)	1.5%
	(solid part)
Glycerin	15%
Ethylene glycol	3%
Triethanolamine	0.7%
Sufynol 465	1.5%
Triethylene glycol monobutyl ether	7%
2-pyrrolidone	4%
Pure water	Remainder
(VI: Yellow ink composition)	
C.I. pigment yellow 128	4.1%
Dispersant (styrene-acrylic acid copolymer)	1.8%
	(solid part)
Glycerin	12%
Diethylene glycol	2%
Triethanolamine	0.7%
Sufynol 465	1%

Triethylene glycol monobutyl ether	8%
2-pyrrolidone	2%
Pure water	Remainder

(Print Evaluation Test)

The ink set A of Embodiment 1 and the ink set B of Embodiment 2 were installed in an ink jet printer PM-770C (made by Seiko Epson), and used to print on a special ink jet recording medium (special glossy film made by Seiko Epson). The ink discharge amount was 0.022 μg per 1/720 dpi, with a resolution set at 720 × 720 dpi.

[0045]

The resulting printed matter exhibited good images, with the images being particularly smooth and without roughness in portions configured by comparatively light colors, as in photographs of human skin or scenery.

[0046]

[Effect of the Invention]

The ink set of the present invention, which exhibits good ink permeability and fixation, is one capable of yielding high quality images with no roughness.

[0047]

The ink jet recording method of the present invention, which exhibits good ink permeability and fixation to a recording medium, enables obtaining high quality images with no roughness.

[0048]

Further, the recording of the present invention comprises a high quality image with no roughness.

[Brief Explanation of Drawing]

[Fig. 1]

Fig. 1 is a model diagram representing a condition wherein, in an ink composition, a pigment is adsorbed to a resin and a resin layer is formed.

[Fig. 2]

Fig. 2 is a simplified diagram showing how ink in an ink set of the present invention, after striking a recording medium, permeates and becomes fixed.

[Fig. 3]

Fig. 3 is a simplified diagram showing how a conventional ink, after striking a recording medium, permeates and becomes fixed.

[Explanation of Reference Numerals]

1 pigment

2 resin

3 recording medium

4 ink

[Title of Document] Abstract

[Summery]

[Object] To provide an ink set, exhibiting good ink permeability and fixation, capable of yielding high quality images with no roughness, and an ink jet recording method and recording, wherein the ink set is used.

[Solution] An ink set comprising a dark ink composition and a light ink composition that, while being mutually the same color, are of different color density, and is characterized in that the dark ink composition and the light ink composition each comprise a pigment as a colorant and a resin as a dispersant, and in that a weight ratio between the resin and the pigment (former/latter) in the dark ink composition is lower than a weight ratio between the resin and the pigment (former/latter) in the light ink composition, is provided.

[Selected Drawing] None